PORTABLE INFORMATION TERMINAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a portable information terminal and, more particularly, to a portable information terminal unit of a type in which a display and a pressure-sensitive input device overlying the display are assembled in its unit body and in which a cover for covering the pressure-sensitive input device is attached to the unit body in a freely openable and closable manner.

2. Description of the Related Arts

Hitherto known as equipment in the field of portable information terminals are products such as "ZAURUS PI-4000" (SHARP Co.) or "NEWTON" (Apple Computer, Inc.) having function of personal information management. In each of these products its unit body includes a liquid crystal display and a transparent pressure-sensitive input device laid over the surface of the liquid crystal display. The pressure-sensitive input device allows the operator to enter characters by tracing its surface with an input pen and to enter a specific function by operationally pressing a function pad appearing on the surface thereof.

The unit body is provided with an opening and closing cover attached thereto for covering the pressure-sensitive input device, so that the pressure-sensitive input device would be protected during out-of-operation. However, there has never existed such products that make it possible to execute the data entry with the input pen or the function pad while the cover is closed. Accordingly, irrespective of how frequent a specific function is used, the cover always must be opened whenever the pressure-sensitive input device is intended to be operated or pressed. Furthermore, when using the input pen in place of the pressing operation with a finger, the frequent pen entry would subject the pressure-sensitive surface of the pressure-sensitive input device to accelerated deterioration.

A remote controller of a video tape recorder is one of the information equipment with a cover attached. For instance, the remote controller of a video tape recorder VZ-H330 supplied by SANYO ELECTRIC CO. comprises, as shown in FIG. **7**, a unit body **103** including a plurality of key pads **101** and a display screen **102**. A selective operation of the key pads **101** allows the operator to enter a variety of functions into the main videotape recorder remote from the controller. For instance, the pressing of an UP channel key pad **104** enables the television channel to sequentially shift up, whereas the pressing of a DOWN key pad **105** enables the channel to sequentially shift down.

The unit body **103** is provided with an opening and closing cover **106** attached thereto for covering the key pads **101** and the display screen **102**. As shown in FIG. **8**, the cover **106** is provided with an UP channel button **107** and a DOWN channel button **108**, which are both exposed on the surface of the cover **106** in a state where the cover **106** is closed. Upon pressing the UP channel button **107** with the cover **106** closed, the base end of the button **107** mechanically depresses the UP channel key pad **104** of the unit body **103**, allowing the channel to shift up. And also, the pressing of the DOWN channel button **108**, with the cover **106** closed, allows the channel to shift down. In this manner, only frequently operated buttons are exposed on the surface of the closed cover **106**, which prevents the key pads covered by the cover **106** from being erroneously or unexpectedly operated. Of course, when the cover **106** is opened, any further various functions can be achieved.

However, in such information equipment with a cover, the operating buttons on the cover are mechanically connected to the corresponding key pads of the unit body, which requires the strict alignment between the bases of the operating buttons and the corresponding key pads. This means that the positions of the cover side operating buttons depend to some extent on the positions of the unit body side key pads. Accordingly, the variation of the design can be restricted and the operability of the information equipment cannot be improved any more. In addition, some measures are needed for causing a pressing force from the cover side operating button to uniformly act on the unit body side key pads so as to ensure reliable actions of the key pads. Furthermore, even in the case of exchange of the covers, since the unit body side key pads only achieve predetermined functions, the versatility would be low.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a portable information terminal allowing, with its cover closed, the entry of functions which may often be used.

Another object of the present invention is to provide a portable information terminal capable of arbitrarily positioning cover side operating buttons and of readily exchanging covers having different specifications.

According to the first aspect of the present invention, a portable information terminal comprising: a unit body including a display and a pressure-sensitive input device overlying the display, the display and the pressure-sensitive input device assembled in the unit body; a cover for opening and closing attached to the unit body for covering the pressure-sensitive input device; and an operating button device provided in the cover for exposing its operating surface from the surface of the cover when the cover is closed, the operating button device causing a pressing force from the operating surface to act on the surface of the pressure-sensitive input device.

With the above structure, the cover protects the surface of the pressure-sensitive input device when the cover is brought into its closed position. In this condition, when a pressing force is applied to the operating surface exposed from the surface of the cover, the operating button device exerts the pressing force onto the surface of the pressure-sensitive input device. Thus, in spite of the closed state of the cover, the operating button device allows desired functions or data to be entered through the pressure-sensitive input device. The allocation of frequently-used functions to the operating button device would further improve the functionality of the portable information terminal.

If the cover is removably attached to the unit body by means of a hinge mechanism, the cover could readily be replaced with another one. With such structure, the maintenance can be facilitated, further, differently specified covers can be attached to the unit body. In this case, with the cover removed, an input pen or fingers may be used to perform data or function entry to the pressure-sensitive input device.

The hinge mechanism may include: a pair of coaxial holes provided in a recess formed in the unit body, the pair of coaxial holes facing to each other at opposite sides of the recess; a pair of coaxial mounting shafts provided on a support which is provided on the cover, the support adapted to be received in the recess, the pair of coaxial mounting shafts being displaceable between a mounting position where the shafts advance into the corresponding coaxial holes and a removing position where the shafts retreat from the corresponding coaxial holes; and biasing means for